TABLE 2-1

SANTA ANA REGION (REG. 8) WMI TARGETED PROJECTS, NEEDS, OR ACTIVITIES – Page 1

PROJECT NEEDS, BY CATEGORY	Watershed Management Area									
	Anaheim Bay/ Huntington Harbour/ Bolsa Chica	Lower Santa Ana River	Coyote Creek/Carbon Ck	Newport Bay	Newport Coast	Upper Santa Ana River	Middle Santa River	Lake Elsinore/ San Jacinto River	Mountain	Big Bear Area
(Shaded projects coincide with regional priorities. See Table 2)										
1. Regional Planning, Assessment, and Monitoring										
Conduct stream assessment inventories: 1) Streambank erosion. 2) Streambed aggradation and erosion. 3) Riparian community species diversity. 4) Overall bank stability and priority sites for planting or other stabilization techniques. 5) What streambed restoration projects can be planned at what portions of a stream, and can a project proposal be effectively assembled for the tasks involved?		X	X	X	X	X	X	X	X	X
Determine the prevalence of dissolved oxygen deficiency in surface waters.	X	X	X	X		X	X	X	X	
Conduct water quality modeling and monitoring to analyze/ validate the source, transport, and fate of pollutants, particularly those projects that support Surface Water Ambient Monitoring Program.	X	X	X	X	X	X	X	X	X	X
Research and develop rapid indicators of bacterial/ pathogenic contamination, acute/chronic toxicity, etc.	X	X	X	X	X	X	X	X	X	X
Evaluate the re-growth potential of bacteria indicators and pathogenic organisms in freshwater habitats.		X	X	X		X	X	X	X	X
Implement programs to reduce pathogens, nutrients, pesticides, and sediment from agricultural fields and urban areas.	X	X	X	X	X	X	X	X	X	X
Identify and evaluate Best Management Practices (BMPs) for the reduction of bacterial indicators and pathogenic organisms in urban settings.	X	X	X	X	X	X	X	X	X	X
Perform beneficial use surveys of inland water bodies.		X	X	X		X	X	X	X	X

TABLE 2-1

SANTA ANA REGION (REG. 8) WMI TARGETED PROJECTS, NEEDS, OR ACTIVITIES – Page 2

PROJECT NEEDS, BY CATEGORY	Watershed Management Area									
	Anaheim Bay/ Huntington Harbour/ Bolsa Chica	Lower Santa Ana River	Coyote Creek/Carbon Ck	Newport Bay	Newport Coast	Upper Santa Ana River	Middle Santa River	Lake Elsinore/ San Jacinto River	Mountain	Big Bear Area
Evaluate sources (including groundwater and air deposition) of organochlorine/hydrocarbon pollutants.	X	X	X	X	X	X	X	X	X	X
Evaluate a Critical Coastal Area (CCA) as a pilot project from those selected for Region 8, to date, Upper Newport Bay, Newport Beach Marine Life Refuge, or Irvine Coast Marine Life Refuge (CCAs are adjacent to Marine Managed Areas receiving flow from CWA Sec. 303(d) impaired waters, or State Water Quality Protection Areas--formerly ASBS sites)				X	X					
Vessel waste reduction projects.	X			X	X	X		X		X
Investigations of beach closures and determination of chronic coliform source locations.	X	X		X	X					
Model nearshore/ tidal currents at marsh and estuary inlets to understand pollutant transport patterns.	X	X		X	X					
Conduct baseline watershed assessments for sediment load. Inventory locations where sediment chronically enters streams i.e. rural roads, various streambanks, construction sites, grazing impacts.	X	X	X	X	X	X	X	X	X	X
Determine surface waters with detected and elevated endocrine disrupting compounds.	X	X	X	X	X	X	X	X	X	X
Address WQ standards compliance and WQ impacts as a result of the October 2003 and May 2004 fires and subsequent debris flows.						X		X	X	X
Support studies to update list of impaired water bodies required by CWA Section 303(d), with germane stressors/pollutants.	X	X	X	X	X	X	X	X	X	X
Inventory in the field any water bodies and wetlands that may be added or even deleted from Basin Plan list. Redefine any reaches of inland streams.	X	X	X	X	X	X	X	X	X	X
Implement Clean Beach Initiative issues, including rapid indicators and diversions.	X	X		X	X					
2. Regional Mapping, GIS, and Database Management										
Create and support two full time Regional Board staff positions: Database Manager and GIS Analyst.	X	X	X	X	X	X	X	X	X	X
Provide introductory GIS training for all technical staff and intermediate GIS training for interested staff.	X	X	X	X	X	X	X	X	X	X
Upgrade to ArcGIS if there is staff GIS Analyst.	X	X	X	X	X	X	X	X	X	X
Assess Region 8 needs for GIS development, including identification of priority tasks, data and the capability of specific data manipulation, hardware/ software to accomplish it, GIS database creation, metadata creation, and associated training.	X	X	X	X	X	X	X	X	X	X

TABLE 2-1

SANTA ANA REGION (REG. 8) WMI TARGETED PROJECTS, NEEDS, OR ACTIVITIES – Page 3

PROJECT NEEDS, BY CATEGORY	Watershed Management Area									
	Anaheim Bay/ Huntington Harbour/ Bolsa Chica	Lower Santa Ana River	Coyote Creek/Carbon Ck	Newport Bay	Newport Coast	Upper Santa Ana River	Middle Santa River	Lake Elsinore/ San Jacinto River	Mountain	Big Bear Area
Create a pilot GIS project (see below) based on the above needs assessment (Example: watershed analysis indicating spatial and temporal changes in water quality as improved by Reg. Board programs. After initial pilot project creation, expand it.)	X	X	X	X	X	X	X	X	X	X
Acquire GIS data layers. Obtain appropriate licensed software "off the shelf" or from firms/agencies.	X	X	X	X	X	X	X	X	X	X
Acquire the programs to create GIS data layers and attribute tables, and to populate spatial fields from attribute tables.	X	X	X	X	X	X	X	X	X	X
Create scripts to automate GIS functions.	X	X	X	X	X	X	X	X	X	X
Purchase/acquire software for image manipulation (aerial and satellite imagery), 3D representations (i.e., TDS/TIN distribution), etc.	X	X	X	X	X	X	X	X	X	X
Provide a wide range of web-based and compact-disc based watershed education materials.	X	X	X	X	X	X	X	X	X	X
Create a geodatabase from which to make a variety of maps.	X	X	X	X	X	X	X	X	X	X
Provide STORET training for interested staff.	X	X	X	X	X	X	X	X	X	X
STORET setup and input of existing data.	X	X	X	X	X	X	X	X	X	X
Input resource monitoring and compliance monitoring data into STORET.	X	X	X	X	X	X	X	X	X	X
Create format for batch updates.	X	X	X	X	X	X	X	X	X	X
Input all monitoring data from point sources, i.e. hydrocarbon, TDS, perchlorate levels in wells, and non-point sources, i.e., wide-area runoff, to allow study of the spatial and temporal trend of water quality in the entire region. Apply to each WMA.	X	X	X	X	X	X	X	X	X	X
Gather GIS data pertaining to hydrology (storm drains, concrete-lined portions of channels, etc.).	X	X	X	X	X	X	X	X	X	X
Use digitized official Region boundary (CalWaters, DWR) to create maps of Region 8 with detailed boundary lines layered upon topography and streets (political map software). Coordinate this delineation with the other Regions and show some of an adjacent Region's jurisdiction on the maps. Record changes using GPS or other means in the field wherever boundary and man-made "divides" are now more difficult to distinguish i.e. Wildomar/Menifee, Aliso Ck.	X		X		X		X	X	X	X

TABLE 2-1

SANTA ANA REGION (REG. 8) WMI TARGETED PROJECTS, NEEDS, OR ACTIVITIES – Page 4

PROJECT NEEDS, BY CATEGORY	Watershed Management Area									
	Anaheim Bay/ Huntington Harbour/ Bolsa Chica	Lower Santa Ana River	Coyote Creek/Carbon Ck	Newport Bay	Newport Coast	Upper Santa Ana River	Middle Santa River	Lake Elsinore/ San Jacinto River	Mountain	Big Bear Area
Identify a priority task for GIS development from the above, or from projects such as the following, as a mapping project (maps can show "snapshots-in-time" and/or changing conditions). Suggested projects:										
1) Map hydrocarbon/ perchlorate/ MTBE plume migration; TIN/ TDS concentrations; high selenium areas.	X	X	X	X	X	X	X	X	X	X
2) Map potential and selected reference sites, i.e., for biocriteria, nutrients.										
3) Map changes in water quality as a result of a Best Management Practice or multiple BMPs used, or a Non-Point Source (NPS) Management Measure (MM).										
4) Map changes in water quality as a result of BMP implementation for TMDL compliance. Use monitoring data to assist in evaluating effectiveness of BMPs.										
5) Acquire data to assist in TMDL compliance.										
6) Map changes in land use patterns linked to changes in water quality.	X	X	X	X	X	X	X	X	X	X
7) Map habitat types or changes to habitat stand boundaries over time, i.e., change of riparian/CSS/grassland mosaic boundaries; changes to course of a stream, etc.										
8) Map Region 8 wetlands/riparian habitat. Indicate existing sites not under protection; reconstructed/created wetlands, restoration efficacy or potential, and impacts over time to wetlands, i.e., size, depth, range, and mitigation sites.	X	X				X	X	X	X	X
9) Map stream channel erosion areas vs. bank stabilized areas. Map streambank restoration potential.										
10) Map channelization; soft-bottomed portions; stretches of "gaining" vs. "losing" streams; non-effluent streams and effluent outfalls.										

TABLE 2-1

SANTA ANA REGION (REG. 8) WMI TARGETED PROJECTS, NEEDS, OR ACTIVITIES – Page 5

PROJECT NEEDS, BY CATEGORY	Watershed Management Area									
	Anaheim Bay/ Huntington Harbour/ Bolsa Chica	Lower Santa Ana River	Coyote Creek/Carbon Ck	Newport Bay	Newport Coast	Upper Santa Ana River	Middle Santa River	Lake Elsinore/ San Jacinto River	Mountain	Big Bear Area
3. Reference Sites and Biological Indicies										
Conduct regional surveys to nominate and establish sites that can be referenced for setting/enforcing water quality standards, etc. These "referenced sites" will be stream segments, reaches of lakes or estuaries, ocean water areas, etc., where water quality, beneficial uses, and the prevailing ecosystem have not been severely disturbed by human activities, i.e., El Morro Creek at Crystal Cove State Park.	x	x	x	x	x	x	x	x	x	x
Conduct water quality monitoring and bioassessment of these referenced sites, to establish benchmarks for restoration efforts, setting/enforcing standards, etc.	x	x	x	x	x	x	x	x	x	x
Develop biocriteria for each aquatic life use for each water body class (see Module 11 of USEPA's Water Quality Standards Academy workbook).	x	x	x	x	x	x	x	x	x	x
Establish impacts of pollutants on beneficial uses.	x	x	x	x	x	x	x	x	x	x
4. TMDL Development										
Compile data (GIS, water quality, etc.) and separate by watershed management areas.	x	x	x	x	x	x	x	x	x	x
Evaluate impacts of 303(d) listed constituents on beneficial uses.	x	x	x	x	x	x	x	x	x	x
Evaluate data used in placing water body on 303(d) list (what water quality standards were violated?).	x	x	x	x	x	x	x	x	x	x
Evaluate where (temporally and spatially), in TMDL-candidate water body, beneficial uses are supported or impaired.	x	x	x	x	x	x	x	x	x	x
Develop and update a dynamic water quality model.	x	x	x	x	x	x	x	x	x	x
Develop TMDL with defensible calculations and load allocations, consistent with the California Toxics Rule (CCR) and State Implementation Plan (SIP).	x	x	x	x	x	x	x	x	x	x
Conduct water quality monitoring in water column and continue monitoring after TMDL adopted.	x	x	x	x	x	x	x	x	x	x
5. TMDL Implementation										
Set up water quality models and updates for watersheds and receiving waters.	x	x	x	x	x	x	x	x	x	x

TABLE 2-1

SANTA ANA REGION (REG. 8) WMI TARGETED PROJECTS, NEEDS, OR ACTIVITIES – Page 6

PROJECT NEEDS, BY CATEGORY	Watershed Management Area									
	Anaheim Bay/ Huntington Harbour/ Bolsa Chica	Lower Santa Ana River	Coyote Creek/Carbon Ck	Newport Bay	Newport Coast	Upper Santa Ana River	Middle Santa River	Lake Elsinore/ San Jacinto River	Mountain	Big Bear Area
Conduct water quality and watershed model simulations to validate and/or revise load allocations and evaluate compliance with TMDLs.	X	X	X	X	X	X	X	X	X	X
Create models to simulate groundwater/ surface water interactions that account for contaminant loadings to the watershed, and assess potential remediation strategies.	X	X	X	X	X	X	X	X	X	X
Identify BMPs to reduce/remove nutrients/sediment.	X	X	X	X	X	X	X	X	X	X
Review/revise water quality objectives, including nutrients (Ranked on Basin Plan 2002 Triennial Review priority list).	X	X	X	X	X	X	X	X	X	X
Evaluate in-lake water quality management strategies and management practices.		X				X	X	X	X	X
Education/outreach for reducing polluted runoff from urban, agricultural, CAFO, and forested areas.	X	X	X	X	X	X	X	X	X	X
Perform field surveys to determine the sources of dry-weather urban nuisance runoff for all WMAs.	X	X	X	X	X	X	X	X	X	X
Education/outreach for controlling invasive species.	X	X	X	X	X	X	X	X	X	X
Classify and assess condition of "unimproved" creeks and streams.	X	X	X	X	X	X	X	X	X	X
Monitor water quality, both biological and geochemical. Monitor for nutrient and pathogens.	X	X	X	X	X	X	X	X	X	X
Evaluate the re-growth potential of bacterial indicators and pathogenic organisms in freshwater habitats, even those immediately adjacent to coast.	X	X	X	X	X	X	X	X	X	X
Identify and evaluate BMPs for reduction of bacterial indicators/ pathogenic organisms in urban settings.	X	X	X	X	X	X	X	X	X	X
Identify and evaluate bacterial indicator and pathogen off-site transport mechanisms (and BMPs for their reduction) associated with agricultural operations.				X		X	X	X	X	X
Implement BMPs and NPS management measures.	X	X	X	X	X	X	X	X	X	X
Develop a pollutant budget model that can be used to track water quality changes over time.	X	X	X	X	X	X	X	X	X	X
Conduct REC-1 Beneficial Use assessment (Ranked on Basin Plan 2002 Triennial Review priority list).	X	X	X	X	X	X	X	X	X	X
Conduct food web and egg studies for detection of bioaccumulative compounds.	X	X	X	X	X	X	X	X	X	X
Identify sensitive/ indicator species for accumulation of specific contaminants.	X	X	X	X	X	X	X	X	X	X
6. Stakeholder Support and Public Outreach										
Create stakeholder watershed planning groups and develop watershed management plans, including watershed and regional water resources education.	X	X	X	X	X	X	X	X	X	X

TABLE 2-1

SANTA ANA REGION (REG. 8) WMI TARGETED PROJECTS, NEEDS, OR ACTIVITIES – Page 7

PROJECT NEEDS, BY CATEGORY	Watershed Management Area									
	Anaheim Bay/ Huntington Harbour/ Bolsa Chica	Lower Santa Ana River	Coyote Creek/Carbon Ck	Newport Bay	Newport Coast	Upper Santa Ana River	Middle Santa River	Lake Elsinore/ San Jacinto River	Mountain	Big Bear Area
Promote cooperative relationships and stakeholder partnerships.	X	X	X	X	X	X	X	X	X	X
Workshops to educate land developers about state-of-the-art water quality mitigation practices, systems, and devices/retrofits.	X	X	X	X	X	X	X	X	X	X
Conduct public outreach and education on the linkage between surface and ground water quality.	X	X	X	X	X	X	X	X	X	X
Promote riparian/adjacent open space preservation.	X	X	X	X	X	X	X	X	X	X
Non-Point Source and TMDL workshops, including urban runoff and stormwater education.	X	X	X	X	X	X	X	X	X	X
Support Adopt-A-Watershed program.	X	X	X	X	X	X	X	X	X	X
CAFO operator workshop/ biosolids workshop, including waste management practices.		X	X	X		X	X	X	X	X
Facilitate coordination of local grass-roots watershed management groups and environmental interest groups among themselves and with the Regional Board, as a way of furthering the goals of the Region 8 and State Board watershed management initiative.	X	X	X	X	X	X	X	X	X	X
Encourage alternatives to concrete, riprap, hardscapes using pervious materials and vegetation.	X	X	X	X	X	X	X	X	X	X
Discourage development on floodplains.	X	X	X	X	X	X	X	X	X	X
Establish visitor centers that implement watershed education.	X	X	X	X	X	X	X	X	X	X
Citizen monitoring tasks: 1) Collect water quality monitoring samples. 2) Collect observational water quality data, such as beneficial use occurrence and assessment. 3) Conduct stream classification and assessment inventories. 4) Assess effectiveness of BMPs implementing pollution prevention, source control, and source reduction. 5) Monitor/prevent spread of invasive species.	X	X	X	X	X	X	X	X	X	X
7. Wetlands/ Riparian/ Stream Restoration and Preservation										
Support acquisition of wetlands and other areas that support WARM, WILD, EST, SPWN, BIOL, COLD and REC1 and/orREC2 beneficial uses.	X	X	X	X	X	X	X	X	X	X
Implement measures to restore tidal exchange or freshwater influx in fragmented estuaries, coastal lagoons wetlands, or freshwater wetlands.	X	X		X	X					
Provide for identification and delineation of vernal pools and their special protection/ preservation.			X	X	X	X		X	X	X

TABLE 2-1

SANTA ANA REGION (REG. 8) WMI TARGETED PROJECTS, NEEDS, OR ACTIVITIES – Page 8

PROJECT NEEDS, BY CATEGORY	Watershed Management Area									
	Anaheim Bay/ Huntington Harbour/ Bolsa Chica	Lower Santa Ana River	Coyote Creek/Carbon Ck	Newport Bay	Newport Coast	Upper Santa Ana River	Middle Santa River	Lake Elsinore/ San Jacinto River	Mountain	Big Bear Area
Support creation of riparian buffers.	X	X	X	X	X	X	X	X	X	X
Support wetlands creation, enhancement, and restoration.	X	X	X	X	X	X	X	X	X	X
Provide tracking system of wetlands acreages to numerically ensure that there is no net loss of wetland area, including isolated wetlands. Determine area of wetlands with good quality. List loss vs. recovery projects in concert with other Regions, agencies, and NGOs.	X	X	X	X	X	X	X	X	X	X
Support stream and bank erosion stabilization projects that use bioengineered solutions.	X	X	X	X	X	X	X	X	X	X
Conduct stream classification/assessment studies.	X	X	X	X	X	X	X	X	X	X
Establish/identify reference reaches of surface waters.		X	X	X	X	X	X	X	X	X
Develop regional hydrologic curves.	X	X	X	X	X	X	X	X	X	X
Collaborate in producing a stream restoration handbook.	X	X	X	X	X	X	X	X	X	X
Assess condition of mitigation banks and classify them.	X	X	X	X	X	X	X	X	X	X
Restore beneficial uses to streams through the application of fluvial geomorphology principles.	X	X	X	X	X	X	X	X	X	X
Preserve and protect remaining unimproved stream segments.	X	X	X	X	X	X	X	X	X	X
Remove concrete channel linings from streams and flood control channels, and restore beneficial uses, such as WILD, WARM, GWR, REC2 and/or REC1, of these channels.	X	X	X	X	X	X	X	X	X	X
"Daylight" fully enclosed drainage channels and similar surface waters and restore the above beneficial uses.	X	X	X	X	X	X	X	X	X	X
Implement program of removal for channel "armor", dams, and weirs with budget and schedule from flood control agencies.	X	X	X	X	X	X	X	X	X	X
Encourage environmental easement acquisitions.	X	X	X	X	X	X	X	X	X	X
Discourage development on flood plains.	X	X	X	X	X	X	X	X	X	X
Where development in a flood plain is already occurring, encourage the use of bioengineering techniques to stabilize and restore water courses to minimize potential destabilization from the loss of the flood plain (i.e. erosion of stream banks, accelerated downcutting, and headward erosion), and to reduce impacts from increased dry weather flows from urban development and flooding.	X	X	X	X	X	X	X	X	X	X
Wetlands management projects that are consistent with the Southern California Wetlands Recovery Project goals/objectives.	X	X	X	X	X	X	X	X	X	X

TABLE 2-1

SANTA ANA REGION (REG. 8) WMI TARGETED PROJECTS, NEEDS, OR ACTIVITIES – Page 9

PROJECT NEEDS, BY CATEGORY	Watershed Management Area									
	Anaheim Bay/ Huntington Harbour/ Bolsa Chica	Lower Santa Ana River	Coyote Creek/Carbon Ck	Newport Bay	Newport Coast	Upper Santa Ana River	Middle Santa River	Lake Elsinore/ San Jacinto River	Mountain	Big Bear Area
8. Habitat Acquisition and Protection										
Preserve and protect endangered and threatened species (plant and animal), their habitat, and movement corridors.	x	x	x	x	x	x	x	x	x	x
Remove barriers to fish spawning (weirs, dams, etc.).	x	x	x	x	x	x	x	x	x	x
Create and improve fish habitat.	x	x	x	x	x	x	x	x	x	x
Preserve and protect designated Critical Coastal Areas (CCA), including State Water Quality Protection Areas (formerly Areas of Special Biological Significance) and certain Marine Managed Areas.	x	x		x	x					
Establish, preserve, and protect wildlife reserves, refuges, and corridor linkages.	x	x	x	x	x	x	x	x	x	x
Preserve/protect riparian buffers and "unimproved" streams.	x	x	x	x	x	x	x	x	x	x
Preserve and protect important migratory waterfowl layover sites.	x	x	x	x	x	x	x	x	x	x
Invasive species management including projects that:										
1) Eradicate Eurasian milfoil (*Myriophyllum spicatum*) in the Big Bear WMA (see below).										x
2) Eradicate *Arundo donax* region-wide.	x	x	x	x	x	x	x	x	x	x
3) Eradicate *Caulerpa taxifolia* through education, prevention, and removal in coastal lagoons, estuaries, harbors/bays.	x			x						
4) Eradicate tamarisk (*Tamarix reamosissima*, *T. chinensis*, and hybrids) throughout the watershed.		x	x	x	x	x	x	x	x	
5) Control, if not eradicate, Castor bean (*Ricinis communis*) throughout the watershed, particularly in riparian areas.	x	x	x	x	x	x	x	x		
6) Control California (Peruvian) pepper tree (*Schinus molle*) in areas of flowing or standing water.	x	x	x	x	x	x	x	x	x	
9. Best Management Practices (BMPs), Non-Point Source (NPS) Management Measures (MMs), and Implementation (Focus on Source Control)										
Increase emphasis on BMPs and NPS MMs for control of upper watershed sources of NPS pollutants, including CAFOs and agriculture.						x	x	x	x	

TABLE 2-1

SANTA ANA REGION (REG. 8) WMI TARGETED PROJECTS, NEEDS, OR ACTIVITIES – Page 10

PROJECT NEEDS, BY CATEGORY	Watershed Management Area									
	Anaheim Bay/ Huntington Harbour/ Bolsa Chica	Lower Santa Ana River	Coyote Creek/Carbon Ck	Newport Bay	Newport Coast	Upper Santa Ana River	Middle Santa River	Lake Elsinore/ San Jacinto River	Mountain	Big Bear Area
Develop and/or implement BMPs and MMs for nutrient and sediment reduction/removal.	X	X	X	X	X	X	X	X	X	X
Utilize physical/chemical treatment as BMPs / MMs	X	X	X	X	X	X	X	X	X	X
Support water conservation measures.	X	X	X	X	X	X	X	X	X	X
Develop and implement BMPs and MMs for reducing and/or treating recycled water runoff.	X	X	X	X	X	X	X	X	X	X
Develop dry weather flow diversion projects (from channels) to "offline" natural filtering treatment system projects, and sewer.	X	X	X	X	X	X	X	X	X	X
Develop wet weather runoff treatment projects, including diversions to "offline" natural filtering treatment system projects.	X	X	X	X	X	X	X	X	X	X
Support conversions to drip irrigation.	X	X	X	X	X	X	X	X	X	X
Develop and/or implement BMPs to reduce toxicity.	X	X	X	X	X	X	X	X	X	X
Implement/teach Integrated Pest Management (IPM) practices.	X	X	X	X	X	X	X	X	X	X
Develop and/or implement pet waste / good housekeeping BMPs.	X	X	X	X	X	X	X	X	X	X
Develop and/or implement for fertilizer/ manure applications rates to cropland.	X	X	X	X	X	X	X	X	X	X
Deliver BMP and NPS MM education and outreach, focused on locally important NPS issues, to targeted audiences.	X	X	X	X	X	X	X	X	X	X
10.Groundwater Resource Protection										
Groundwater model for the entire Santa Ana Basin, as well as for each subbasin/ management zone.	X	X	X	X	X	X	X	X	X	X
Coordinate as many groundwater elevations /water quality data points as possible into one regional database.	X	X	X	X	X	X	X	X	X	X
Support Department of Water Resources update on Groundwater Basins of California, providing summary data on subbasins.	X	X	X	X	X	X	X	X	X	X
Plan effective uses of brownfields that protect groundwater quality.	X	X	X	X		X	X	X		
Develop groundwater management plans where none exist.	X	X	X	X	X	X	X	X	X	X
Develop and implement a regional groundwater monitoring program. Inventory of impacted drinking water supply wells throughout Region, with primary contaminants/ concentrations.	X	X	X	X	X	X	X	X	X	X
Support protection of groundwater recharge areas.		X	X	X		X	X	X	X	X

TABLE 2-1

SANTA ANA REGION (REG. 8) WMI TARGETED PROJECTS, NEEDS, OR ACTIVITIES – Page 11

PROJECT NEEDS, BY CATEGORY	Watershed Management Area									
	Anaheim Bay/ Huntington Harbour/ Bolsa Chica	Lower Santa Ana River	Coyote Creek/Carbon Ck	Newport Bay	Newport Coast	Upper Santa Ana River	Middle Santa River	Lake Elsinore/ San Jacinto River	Mountain	Big Bear Area
Support protection of groundwater sources including ephemeral streams, meadows, and vernal pools.	X	X	X	X	X	X	X	X	X	X
Plan and construct wellhead treatment facilities for removal of perchlorate from groundwater extracted by municipal supply wells.	X	X	X	X		X	X	X	X	X
Plan and construct desalters and related peripheral facilities.	X	X	X	X		X	X	X	X	X
Support for seawater intrusion barrier programs.	X	X		X	X					
Connect onsite sewage disposal to sewer systems: 1) Facilitate connections to regional sewage collection systems in areas with known or suspected water quality impairment related to use of such systems, particularly in areas close to surface waters or with perched or regionally shallow groundwater.						X	X	X	X	X
Support efforts to upgrade, expand, and modernize regionwide infrastructure of sewage collection and wastewater treatment systems.	X	X	X	X	X	X	X	X	X	X
PROJECT NEEDS BY WATERSHED MANAGEMENT AREA **A. Anaheim Bay / Huntington Harbour / Bolsa Chica Watershed Management Area**										
Conduct vessel waste studies including sediment and barnacles (continue recent efforts, with the potential to add sites).	X									
Conduct repair/ upgrade/ installations of pumpout stations in Huntington Harbour.	X									
Monitor bay- and inlet-wide water quality, biota (macroinvertebrate), and sediment.	X									
Build dry weather flow diversion structures that connect to treatment systems, “offline natural treatment systems,” or sewer. Build similar wet weather flow treatment systems.	X									

TABLE 2-1

SANTA ANA REGION (REG. 8) WMI TARGETED PROJECTS, NEEDS, OR ACTIVITIES – Page 12

PROJECT NEEDS, BY CATEGORY	Watershed Management Area									
	Anaheim Bay/ Huntington Harbour/ Bolsa Chica	Lower Santa Ana River	Coyote Creek/Carbon Ck	Newport Bay	Newport Coast	Upper Santa Ana River	Middle Santa River	Lake Elsinore/ San Jacinto River	Mountain	Big Bear Area
Comparisons of traditional pathogen indicator assays and human virus/ coliphage analyses.	X									
Remove and relocate sewer line currently located beneath the entrance to the Anaheim Bay National Wildlife Refuge.	X									
Support projects of the Huntington Harbour Water Quality Issues Committee and the Bolsa Chica Technical Advisory Committee.	X									
Assess and link water quality values to the varying strata of a water body and determine how much of each strata meets water quality standards.	X									
Runoff treatment projects for East Garden Grove Wintersburg Channel. Monitor discharge to Huntington Harbour for metals, pathogens, toxicity.	X									
Increase biomass of pickleweed (*Salicornia* sp.) and cord grass (*Spartina foliosa*) in Upper Newport Bay and Anaheim Bay.	X									
Increase biomass of eelgrass (*Zostera marina*) in Huntington Harbour and other deep channels.	X									
B. Lower Santa Ana River Watershed Management Area										
Studies of pathogen pathways from urbanization, aiding implementation of a pathogen TMDL.		X								
Build dry weather flow diversion structures that connect to treatment systems, "offline natural treatment systems," or sewer. Build similar wet weather flow treatment systems.		X								
Evaluate as a reference site the watershed of Fremont Canyon, tributary to Santiago Creek in Orange County's Santa Ana Mountains. It is among the few remaining relatively pristine watersheds in Orange County (*Nature Conservancy*).		X								
Restore, rehabilitate, preserve and maintain riparian buffers along the Santa Ana River and its tributaries.		X								
Support Santiago Creek habitat protection and enhancement programs.		X								
Efficiently supply surface water to recharge basins.		X								
Projects protecting Santa Ana Forebay groundwater recharge basins from nitrogen, TDS, and petroleum/ chlorinated hydrocarbons.		X								
Assess integrity of wetlands, estimate acreage, record and map them.		X								
Support WARM, WILD, RARE, REC2 through acquisition and preservation of habitat in the Puente-Chino Hills, Santa Ana Canyon, and Santa Ana Mountains.		X								

TABLE 2-1

SANTA ANA REGION (REG. 8) WMI TARGETED PROJECTS, NEEDS, OR ACTIVITIES – Page 13

PROJECT NEEDS, BY CATEGORY	Watershed Management Area									
	Anaheim Bay/ Huntington Harbour/ Bolsa Chica	Lower Santa Ana River	Coyote Creek/Carbon Ck	Newport Bay	Newport Coast	Upper Santa Ana River	Middle Santa River	Lake Elsinore/ San Jacinto River	Mountain	Big Bear Area
Studies of surface water / groundwater interactions between the Santa Ana Forebay and the Santa Ana Pressure Zone.		X								
Conduct outreach to determine interest in developing subwatershed plans based on specific water quality concerns.		X								
C. Coyote Creek/ Carbon Creek Watershed Management Area										
Installation of dry- and wet- weather flow diversion structures, to treatment systems, "offline natural treatment systems," or sewer. Build similar wet weather flow treatment systems.			X							
Monitor, control, and mitigate urban runoff and other impacts from development in the Puente-Chino Hills and Coyote Hills.			X							
Support WARM, WILD, RARE, REC2 through acquisition and preservation of habitat in the Puente-Chino Hills and Coyote Hills.			X							
Restore, enhance, and create wetlands/ waterways.			X							
Restore lost and degraded beneficial uses to Coyote and Carbon Creeks, including WARM, WILD, RARE, REC2. Support and develop management and restoration plans for the Coyote/ Carbon Creeks Watersheds.			X							
D. Newport Bay Watershed Management Area										
Perform model simulations for nutrients, algae, and oxygen in upper and lower Newport Bay (NB).				X						
Implement BMPs to remove nitrogen and selenium from groundwater (as well as other sources) in the NB watershed, specifically one project in Peters Canyon Channel and a second in San Diego Creek Reach 2.				X						
Implement BMPs to remove nitrogen from agricultural sources in the NB watershed. Encourage agricultural and urban dischargers to implement control measures to reduce fecal coliform levels and to track the effectiveness of all these measures.				X						
Design and carry out an urban runoff fecal coliform source identification plan for the NB Fecal TMDL.				X						
Design and implement urban runoff fecal coliform source control measures for the NB Fecal TMDL.				X						
Design and carry out a natural fecal coliform source identification plan for the NB Fecal TMDL.				X						

TABLE 2-1

SANTA ANA REGION (REG. 8) WMI TARGETED PROJECTS, NEEDS, OR ACTIVITIES – Page 14

PROJECT NEEDS, BY CATEGORY	Watershed Management Area									
	Anaheim Bay/ Huntington Harbour/ Bolsa Chica	Lower Santa Ana River	Coyote Creek/Carbon Ck	Newport Bay	Newport Coast	Upper Santa Ana River	Middle Santa River	Lake Elsinore/ San Jacinto River	Mountain	Big Bear Area
Design and implement a natural fecal coliform source control plan for the NB Fecal TMDL.				X						
Conduct vessel waste studies, including sediment and barnacles (continue recent efforts, with the potential to add sites).				X						
Support efforts to make use of hull cleaning/ hull management techniques that reduce pollutant loadings to marina waters.				X						
Conduct studies of vessel waste pumpout stations and conduct repair/ upgrade/ installations of stations in Newport Bay.				X						
Anadromous fish restoration (steelhead trout). GIS maps of fish migration blockages and deficiencies.				X						
Monitor Newport Dunes water quality, biota (macroinvertebrates) and sediment as part of Baywide program.				X						
Focus a project on comparisons of traditional pathogen indicator assays and human virus/ coliphage analyses.				X						
Install dry weather flow diversion structures and connect to treatment systems, "offline natural treatment systems," or sewer.				X						
Develop and implement management plans that specify practices to reduce sediment and chemical pollutant loadings from row crops, nurseries and/or citrus/avocado orchards.				X						
Design a study to evaluate potential pollutant loadings from agriculture in the Newport Bay watershed. Study would screen surface soils to assess current concentrations of organochlorine compounds, soil texture, and soil TOC as predictors of future pollutant loadings.				X						
Investigate bioaccumulation of organochlorine compounds and selenium in San Diego Creek and Upper/Lower Newport Bay at multiple trophic levels, and develop site-specific biota-sediment accumulation factors, through rigorous studies.				X						
Assess and model long-term impacts of Sediment TMDL, MS4 Permit and BMPs, and USACOE dredging on aggradation/degradation of Newport Bay (Is a sediment-heavy system becoming a sediment-starved system?) and beaches – both up-coast and down-coast as well as intra-bay impacts.				X						
Evaluate biodiversity, and compliance with water quality standards, for Upper Newport Bay CCA.				X						
Stream restoration projects throughout the watershed that stabilize embankments, or remove "armor" and restore embankments.				X						

TABLE 2-1

SANTA ANA REGION (REG. 8) WMI TARGETED PROJECTS, NEEDS, OR ACTIVITIES – Page 15

PROJECT NEEDS, BY CATEGORY	Watershed Management Area									
	Anaheim Bay/ Huntington Harbour/ Bolsa Chica	Lower Santa Ana River	Coyote Creek/Carbon Ck	Newport Bay	Newport Coast	Upper Santa Ana River	Middle Santa River	Lake Elsinore/ San Jacinto River	Mountain	Big Bear Area
Support Serrano Creek preservation, restoration, and revegetation.				X						
Support Borrego Creek preservation, restoration, and revegetation.				X						
Use development of The Great Park, El Toro to leverage opportunities to "daylight" fully enclosed channels and to initiate restoration efforts on Agua Chinon and Bee Canyon channels.				X						
Create areas that support WILD and WARM beneficial use areas in The Great Park, El Toro.				X						
Implement NPS Management Measures for The Great Park, El Toro.				X						
Determine depth of pollution / contamination in the Rhine Channel. Assess remedial options for cleanup of the Rhine Channel to meet TMDLs.				X						
Assess ways to increase oxygen and circulation in the Rhine Channel.				X						
Biological and geochemical investigation of the UCI portion of the San Joaquin Marsh for selenium.				X						
Egg studies for presence of selenium and other bioaccumulative compounds in both the San Joaquin Marsh and Newport Bay areas. Target live eggs for non-threatened and endangered species. Target unhatched, nonviable eggs for threatened and endangered species such as the Brown Pelican, Least Tern, and Light-footed Clapper Rail.				X						
Identification and assessment of remedial options for selenium removal from groundwater and surface water in the Peters Canyon Wash area of San Diego Creek (original Swamp of the Frogs area).				X						
Natural Treatment System (NTS) Projects focused on urban runoff, legacy contamination, and groundwater influence from the entire watershed.				X						
Increase biomass of pickleweed (*Salicornia* sp.) and cord grass (*Spartina foliosa*) in Upper Newport Bay and eelgrass (*Zostera marina*) in Lower Newport Bay.				X						
E. Newport Coast Watershed Management Area										
Build dry weather flow diversion structures that connect to treatment systems, "offline natural treatment systems," or sewer. Build similar wet weather flow treatment systems.					X					
Studies determining effects of hydromodification outfalls to coast.					X					

TABLE 2-1

SANTA ANA REGION (REG. 8) WMI TARGETED PROJECTS, NEEDS, OR ACTIVITIES – Page 16

PROJECT NEEDS, BY CATEGORY	Watershed Management Area									
	Anaheim Bay/ Huntington Harbour/ Bolsa Chica	Lower Santa Ana River	Coyote Creek/Carbon Ck	Newport Bay	Newport Coast	Upper Santa Ana River	Middle Santa River	Lake Elsinore/ San Jacinto River	Mountain	Big Bear Area
Implement water quality management elements of California Department of Parks and Recreation's Crystal Cove Historic District Preservation and Public Use Plan.					X					
Projects that focus on comparisons of traditional pathogen indicator assays and human virus/ coliphage analyses.					X					
Coordinate ocean monitoring of benthic and pelagic fauna for toxics, etc., adjacent to natural-drainage modification projects and other outfalls.					X					
Restoration program for Little Corona tide pools/biota.					X					
Restoration of drainages to improve attainment of water quality standards.					X					
Encourage/facilitate Orange County area urban dischargers to develop monitoring programs and evaluate sources of fecal coliform affecting REC1 beneficial use on beaches.	X	X	X	X						
Reduce total/fecal coliform to Buck Gully, Pelican Point Creek, Los Trancos (Crystal Cove Creek), and Muddy Creek (impaired REC1, REC2, and MUN due to pathogens).					X					
Implement projects to protect beneficial uses, i.e., (REC1, REC2, WILD, etc.) of "Little Corona," part of the Newport Coast CCA and State Water Quality Protection Area.					X					
Restore anadramous fish (steelhead trout) habitat.					X					
Conduct projects that protect the integrity of beneficial uses of San Joaquin Hills natural drainages.					X					
Evaluate biodiversity and compliance with water quality standards in Newport Beach Marine Life Refuge Critical Coastal Area.					X					
Evaluate biodiversity and compliance with water quality standards in Irvine Coast Critical Coastal Area (shared project with Region 9).					X					
F. Upper Santa Ana River Watershed Management Area										
Restore, rehabilitate, preserve and maintain riparian buffers along the Santa Ana River (SAR) and its tributaries.						X				
Maximize floodplain/ wildlife corridor swaths on both sides of SAR before pending urbanization claims all land, up to the active channel.						X				

TABLE 2-1

SANTA ANA REGION (REG. 8) WMI TARGETED PROJECTS, NEEDS, OR ACTIVITIES – Page 17

PROJECT NEEDS, BY CATEGORY	Watershed Management Area									
	Anaheim Bay/ Huntington Harbour/ Bolsa Chica	Lower Santa Ana River	Coyote Creek/Carbon Ck	Newport Bay	Newport Coast	Upper Santa Ana River	Middle Santa River	Lake Elsinore/ San Jacinto River	Mountain	Big Bear Area
Support San Timoteo Creek watershed management, riparian habitat, and channel restoration from Barton Road upstream.						X				
Remove *Arundo donax* and tamarisk along the Santa Ana River and its reaches and tributaries. Support and participate in Team Arundo.						X				
Projects to address WQ standards compliance and WQ impacts as a result of the October 2003 and May 2004 fires and subsequent rainy season debris flows.						X				
Connect Reche Canyon Mobile Home Park, Colton, to local sewer system. Extend sewer to parts of Grand Terrace/Colton/ Rialto/Fontana/ Bloomington.						X				
Stabilize and restore "Spring Brook", Market Street at Fairmont Park, Riverside. This creek is not concrete-lined where it discharges into Lake Evans, a tributary of the Santa Ana River.						X				
Remove concrete linings from flood control channels, such as sections of Temescal Creek (upstream of Prado wetlands) and San Sevaine Creek (from the foothills of the San Gabriel Mtns downstream). Another lined drain, Sunnyslope Drain (upstream from the Louis Rubidoux nature center) has spawning habitat for the endangered Santa Ana Sucker (*Catostomus santaanae*).						X				
Programs focusing on Santa Ana Sucker restoration.						X				
Coordinate with USEPA on site-specific objectives for un-ionized ammonia.						X				
Provide desalters and related peripheral facilities, including pipelines, in groundwater subbasins impacted by excessive TDS concentrations resulting from historic land use practices.						X				
Provide wellhead treatment for removal of perchlorate in water produced by municipal supply wells.						X				
Support projects that protect/restore alluvial fan scrub						X				
Consolidate monitoring/ ag well data for nitrates, TDS, and pesticides in Riverside area GW subbasins. Coordinate recycled water recharge projects.						X				
Study pathogen pathways from urbanization, aiding development of a pathogen TMDL.						X				
Projects that support WARM, WILD, RARE, REC2, etc. water quality beneficial uses within areas subject to Multiple Species Habitat Conservation Plans.						X				
Projects that implement the Chino Basin Optimum Basin Management Plan.						X				

TABLE 2-1

SANTA ANA REGION (REG. 8) WMI TARGETED PROJECTS, NEEDS, OR ACTIVITIES – Page 18

PROJECT NEEDS, BY CATEGORY	Watershed Management Area									
	Anaheim Bay/ Huntington Harbour/ Bolsa Chica	Lower Santa Ana River	Coyote Creek/Carbon Ck	Newport Bay	Newport Coast	Upper Santa Ana River	Middle Santa River	Lake Elsinore/ San Jacinto River	Mountain	Big Bear Area
G. Middle Santa Ana River Watershed Management Area										
Support Basin Studies developing multiple TMDLs for pathogens, nitrogen, etc.							X			
Identify and evaluate bacterial indicator and pathogen off-site transport mechanisms (and BMPs for their reduction) associated with agricultural operations.							X			
Perform field surveys to determine the sources of dry-weather urban nuisance runoff from Chino Basin sites							X			
Projects supporting Chino Basin Dairy Runoff Management Plan, Chino Basin Optimum Basin Management Plan, and Organics Management Strategy Implementation.							X			
Projects supporting Chino Basin Integrated Ground and Surface Water Model (CIGSM), part of Chino Basin Water Resources Management Study.							X			
Nitrogen removal activities from consolidated basin drainage at Prado Lake Park and wetlands.							X			
Support measures to protect riparian habitats at Prado Wetlands.							X			
Provide wellhead treatment for removal of perchlorate in water produced by municipal supply wells.							X			
H. Lake Elsinore/ San Jacinto Watershed Management Area										
Revise nutrient water quality objectives for Lake Elsinore, Canyon Lake, and San Jacinto River (SJR).								X		
Update model simulations for nutrients, sediments, and pathogens in the San Jacinto River Watershed.								X		
Conduct monitoring studies to identify sources of toxicity, sediment, and nutrients entering Lake Elsinore, Canyon Lake, and San Jacinto River, leading to the development of multiple TMDLs.								X		
Monitor and track pesticide/ fertilizer/ manure application to cropland in SJR watershed. Implement BMPs to prevent over-application.								X		
Support efforts of Reclaimed Water Task Force to evaluate use of reclaimed water to stabilize level of Lake Elsinore and reduce impairments of beneficial uses from excessive nutrients.								X		
Restore SJR near Mystic Lake and enhance the riparian habitats on CDFG properties.								X		
Restoration programs for Mystic Lake and vernal pools in this WMA.								X		

TABLE 2-1

SANTA ANA REGION (REG. 8) WMI TARGETED PROJECTS, NEEDS, OR ACTIVITIES – Page 19

PROJECT NEEDS, BY CATEGORY	Watershed Management Area									
	Anaheim Bay/ Huntington Harbour/ Bolsa Chica	Lower Santa Ana River	Coyote Creek/Carbon Ck	Newport Bay	Newport Coast	Upper Santa Ana River	Middle Santa River	Lake Elsinore/ San Jacinto River	Mountain	Big Bear Area
Extend regional sewers to Quail Valley and the south shore of Lake Elsinore, and abandon existing septic tank discharges in these areas.								X		
Implement recommended lake management practices.								X		
Provide phosphorus removal treatment for all tertiary effluent proposed to be discharged into L. Elsinore.								X		
Conduct a Nutrient Mass Balance Study for Lake Elsinore/ San Jacinto Watershed.								X		
Advance various projects supporting the San Jacinto River Watershed Council, Watershed Management Plan, and citizen monitoring program.								X		
Reduce nutrients in Canyon Lake.								X		
Assist Canyon Lake aeration program.								X		
Conduct inorganic constituent studies for the SJR.								X		
Preserve existing "unimproved" waterways, reaches, and tributaries of the San Jacinto River, by protecting their natural condition, by establishing adequate buffers, and by stream restoration.								X		
Plan and construct desalters and related peripheral facilities, including pipelines, in groundwater subbasins impacted by TDS concentrations resulting from historic resource and land use practices.								X		
Conduct dynamic water quality models for Lake Elsinore and Canyon Lake to simulate and predict the impacts of activities in the SJR watershed, and of in-lake treatment technology on the in-lake water quality/ beneficial uses.								X		
Assess and link water quality values to the strata of a water body, and determine how much of each strata meets water quality standards.								X		
Assist septic tank removal program by Elsinore Valley Municipal WD.								X		
Projects that support WARM, WILD, RARE, REC2, etc. water quality beneficial uses within areas subject to Multiple Species Habitat Conservation Plans.								X		
I. Mountain Watershed Management Area										
Conduct water quality monitoring to assess effectiveness of the San Bernardino Co. Designated Maintenance Mill Creek Area (DMA).									X	
Support alluvial fan scrub protection, preservation, and restoration projects.									X	

TABLE 2-1

SANTA ANA REGION (REG. 8) WMI TARGETED PROJECTS, NEEDS, OR ACTIVITIES – Page 20

PROJECT NEEDS, BY CATEGORY	Watershed Management Area									
	Anaheim Bay/ Huntington Harbour/ Bolsa Chica	Lower Santa Ana River	Coyote Creek/Carbon Ck	Newport Bay	Newport Coast	Upper Santa Ana River	Middle Santa River	Lake Elsinore/ San Jacinto River	Mountain	Big Bear Area
Studies of pathogen pathways from urbanization, aiding development of a pathogen TMDL.									X	
Support efforts to protect habitat and provide open space for endangered and threatened species, consistent with the Multiple Species Habitat Conservation Plans.									X	
Protect and maintain COLD beneficial uses.									X	
Assess impacts of bark beetle spraying on water quality standards.									X	
Address water quality standards compliance and WQ impacts as a result of tree mortality in upper watershed areas, and subsequent treatment to minimize fire threat.									X	
J. Big Bear Area Watershed Management Area										
Revise nutrient water quality objectives for Big Bear Lake (BBL).										X
Perform model simulations for nutrients, sediment, and macrophytes in BBL and its watershed.										X
Implement BMPs to reduce sediment and nutrient loading into and within BBL.										X
Utilize volunteer monitors for stream classification and assessments of creeks.										X
Identify stream candidates for a referenced reach(es).										X
Restore beneficial species of plants within BBL.										X
Evaluate in-lake water quality management strategies.										X
Protect/conserve/ restore water quality standards of Shay Meadows through purchase, restrictive easements, etc.										X
Programs educating marina operators and boat owners about washing techniques and wastewater recovery.										X
Address WQ standards compliance and WQ impacts as a result of tree mortality, forest treatment to minimize fire threats, and the October 2003 fires.										X
Assess and link water quality values to the different strata of BBL and determine how much of each stratum meets water quality standards.										X
Assess impacts to surface waters and soil from bark-beetle spraying.										X
Support expansion of sewer to subbasin communities.										X